Presbyterian Homes (Evanston) 2.4 MW CHP Application

Fact Sheet

CHP Application

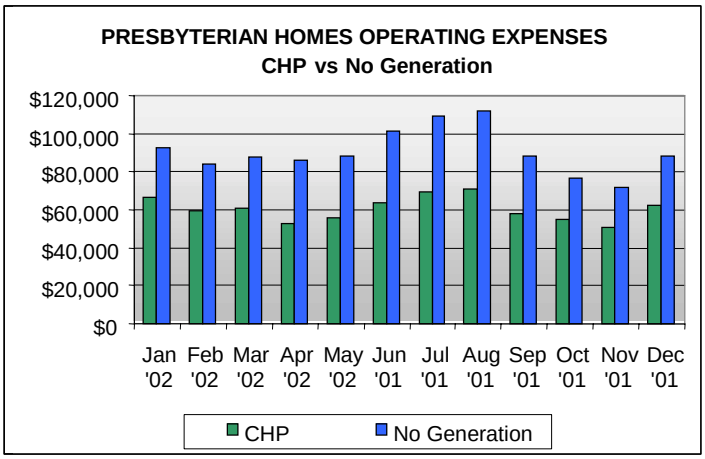
During an ice storm in the winter of 1998, the Evanston campus of Presbyterian Homes lost power for nine hours on a cold and wintry day. Both of the facility's electric utility feeds were knocked out and over 600 senior residents were without electricity. To avoid future outages like this ice storm caused, maintain reliable energy and take advantage of economic savings, Presbyterian Homes made the decision to install a three Caterpillar 3516 natural gas reciprocating engine/generator set system with heat recovery to supply the facility with a maximum of 2.4 megawatts of electrical power and 8,000 lbs. of low-pressure steam. The system has been on-line since January 2001.

QUICK FACTS

Annual Savings:	$360,000
Installed Cost:	$2 Million
Simple Payback:	5+ Years
Generation Capacity*:	2.4 Megawatts
Max. Demand:	1.9 Megawatts
Operation Since:	2001
Facility Size**:	1,000,000 SF

* Electricity supplied to entire campus; thermal heat recovery supplied only to main buildings.

** Main buildings only.



REASONS FOR CHP

"ENERGY RELIABILITY"
&
"ENERGY SAVING"

Purchasing natural gas at 40¢ per therm, and operating their CHP facility 9AM – 10PM weekdays, the Presbyterian Homes is saving over $30,000 per month ($363,000 annually) and maintaining energy reliability. Presbyterian Homes is now paying only 6.42¢ per kWh on-peak compared to previously paying 13.64¢ per kWh on-peak, a savings of 7.22 ¢ per kWh. The calculated rate of return for the CHP project was 17.58% over a 20 year life period of the equipment. The staff of Presbyterian Homes has been exceptionally satisfied with their CHP system.

LaSalle Associates conducted the feasibility Study, provided the design and constructed the Cooling, Heating, and Power (CHP) plant. The CAT engine generator sets were supplied by Patten Power Systems and are under service contract with Patten Power.

CHP SYSTEM EQUIPMENT

- 3 Caterpillar Model 3516 lean burn engine generator sets 1,200 rpm, capacity of 800 kW ea.
- One 2-Cell Marley cooling tower
- 3 Vaporphase VP-4870 Packaged bare fire tube Jacket Water and Exhaust waste Heat Recovery Silencers
- 2 Plate & Frame Heat Exchangers: One for After Cooler Circuit and One for Condensing Unused Steam
- One 1500 Gallon Cooling Tower Water Storage tank with Dual pumps
- Enercon Switchgear and Schweitzer Protective Relays
- Allen-Bradley PLC and Rockwell Software for System Automation/Control
- 1 York Single-Stage 225-ton absorption chiller

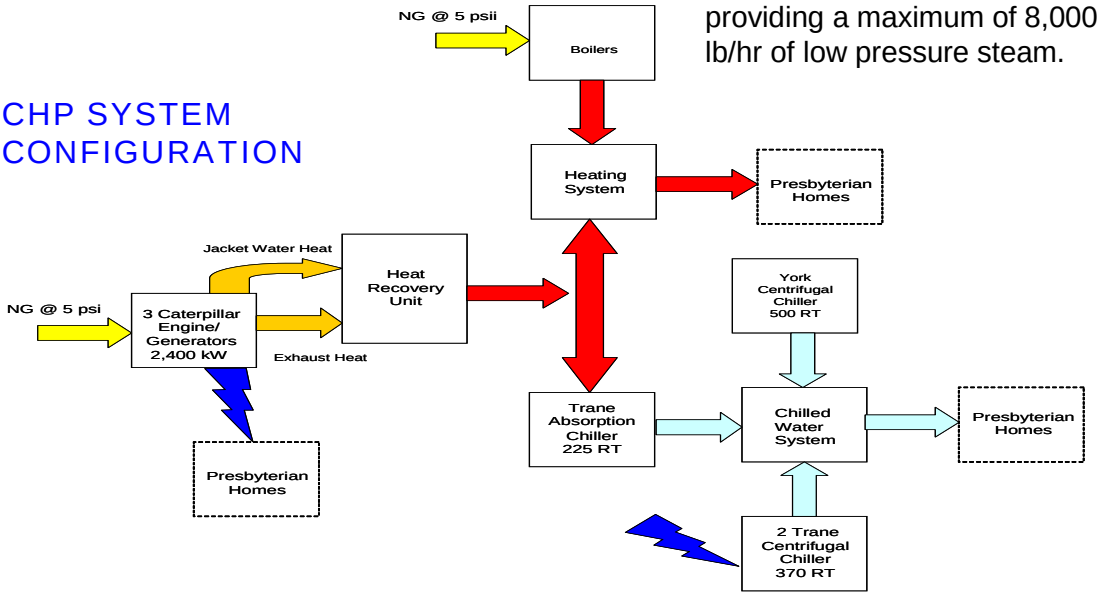
CHP OPERATION

The Evanston Campus of Presbyterian Homes is a 40 acre retirement community consisting of

- 12 main buildings
- 57 town homes
- 54 cottages

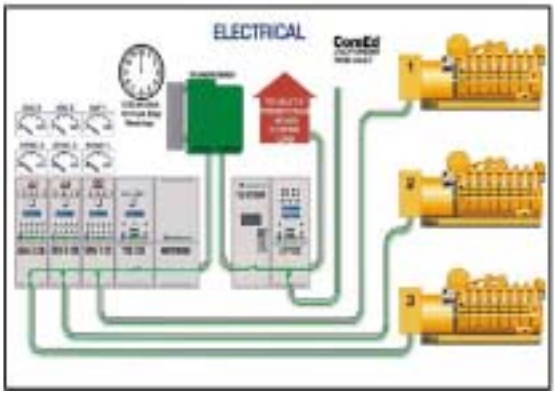
The 2.4 MW CHP plant supplies electricity to the entire campus and provides heating in the winter and absorption cooling in the summer to the main buildings only via the waste heat from the engines. Both the exhaust and jacket water are recovered providing a maximum of 8,000 lb/hr of low pressure steam.

CHP SYSTEM CONFIGURATION



LESSONS LEARNED

- The CHP building was aesthetically pleasing to the community
- Noise considerations were taken into account with an acoustic study
- Presbyterian Homes purchased their own utility transformers
- Support of the local utilities is often beneficial in the overall project economics
- Existing natural gas equipment upgraded to accommodate 5 psi due to generator set requirements



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